mathematical matter in an appendix; and secondly, the natural sequence adopted for the crystallographic systems, from the simplest, viz. the Anorthic, to the most complex, the Cubic. This step, analogous to that which makes our modern geologists and biologists commence with Laurentian, Protozoa, and Protophyta, is one of the greatest philosophical importance. Had space permitted it, we should have liked a little more information on crystallogenesis, more references to the history of the science, a description of the Reflective Goniometer of Wollaston, and more detail in chapter xvii., which treats of 'the Physical Symmetry of Crystals.' In a subsequent edition we may suggest that the italicizing of all technical terms when they first occur should be more uniformly carried out, that more references to figures be inserted in the text, and that the diagrams for finding the symbol of a zone when those of two faces are known, and for finding the symbol of a face common to two zones, on pp. 23, 24, be made clearer. The term 'holohedral forms', though mentioned in the index, is only defined by implication; 'deutosystematic' on p. 72 should, we presume, be 'deuterosystematic;' and Naumann's Method of Projection is only attributed to him in the 'Contents'![1] We would particularly call students' attention to the excellent series of terms proposed by Professor Maskelyne, given on p. 54, and to Mr. Gurney's triumphant proof, on p. 59, that the three rhombohedral planes of symmetry represent the holohedral type of the system, and that the double six-sided pyramid is merely a combination of two rhombohedra. We sincerely congratulate the author on his useful contribution to science; and can only regret that the majority of those pupils whom he has, during some years, instructed in the substance of this work, have gone to India in a capacity in which science can only be the hobby of hard-worked men; so that we can hope for but little fruit from their knowledge of crystallography. G. S. B.

CORRESPONDENCE.

CLAY BOULDERS.

Sir,—An interesting phenomenon which may assist to explain the structure of certain argillaceous rocks is now to be observed on the Crosby shore near the River Alt.

Some time since a trench had been cut in the blue clay, which underlies the Peat and Forest Bed,[2] in a south-westerly direction across the shore. For many years this trough, though filled by the tide at springs, has remained open, with simply a deposit of sand on the bottom. I have not measured it, but I should judge the trench to have been about fifty yards long, five feet wide, and two feet deep. At the present moment it is filled up nearly to the surface with an agglomeration of rounded lumps of clay more or less compacted together. The clay boulders, for such they are, vary in size

[1] Where his name even is mis-spelt.

[2] See "The Submarine Forest at the Alt Mouth," Quart. Journ. Geol. Soc. vol. xxxiv. pp. 447-8, and other papers therein referred to.

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from eighteen inches on the longer axis to the size of a bean, and from a spherical to an ellipsoidal figure.

We have not far to seek for their origin, as a visit to the lower edge of the peat frayed into a sort of subtidal cliff or series of cliffs by the encroachments of the sea shows a deposit of similar clay boulders at its base. In the neighbourhood of the trench the River Alt meandering over the shore has made great inroads on the Post-Glacial deposits, which compose the substratum, forming a subtidal river cliff of blue clay on its western margin. Lumps of this clay undermined by the currents, fall, break up into pieces, and get rolled into boulders by the action of the tide. The trench has formed a sort of trap for catching and retaining them. The clay-boulders are in contact, and become in the trench compacted together into one solid mass, so that if it were converted into rock its structure would show in some cases distinct argillaceous boulders in a sandy argillaceous matrix, and in others an imperceptible shading of the boulder nucleus into the matrix.

Simply describing the foregoing facts for the information of those interested, I leave geologists to apply the explanation to some of the conglomerates.

T. Mellard Reade.

SIR RICHARD GRIFFITH AND THE OLD RED SANDSTONE.

Sir,—The last big talk I had with the late Sir Richard Griffith was immediately before the British Association Meeting in Belfast, and it was on my work in West Galway and Mayo. Previous to it I had left my maps and sections with him to examine after explaining them. During this conversation we discussed the age of the Louisburgh Toormakeady and Croogh Moyle beds which had been examined and proved to be of Silurian age, and Griffith pointed out that the Curlew Mountain rocks and those near Firodes he always believed to be of the same age and to be about equivalent to the Dingle beds, "but I never," said he, "had time to examine them carefully, and I left them in the Old Red Sandstone because they were very like the conglomerates of the Comeraghs Galters and Knockmeal-down Hills." He also pointed out that there was a decided unconformability in the rocks said to belong to the "Old Red Sandstone formation" in Ireland; while the newer rocks so called seemed to be on different geological horizons. He concluded by saying, "My work must remain as it is, but the working out of the question has still to be done," or words to that effect. Since then I have been carefully examining into the question, starting on what was suggested to me by Griffith, and the results of my labours will be found in my recently published Manual of Irish Geology. This is sufficient to say at the present, as I hope to enter fully into the history of the subject in a paper to be read before the Royal Geological Society of Ireland.

G. Henry Kinahan.

Ovoca, Ireland, *5th November*, 1878.

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